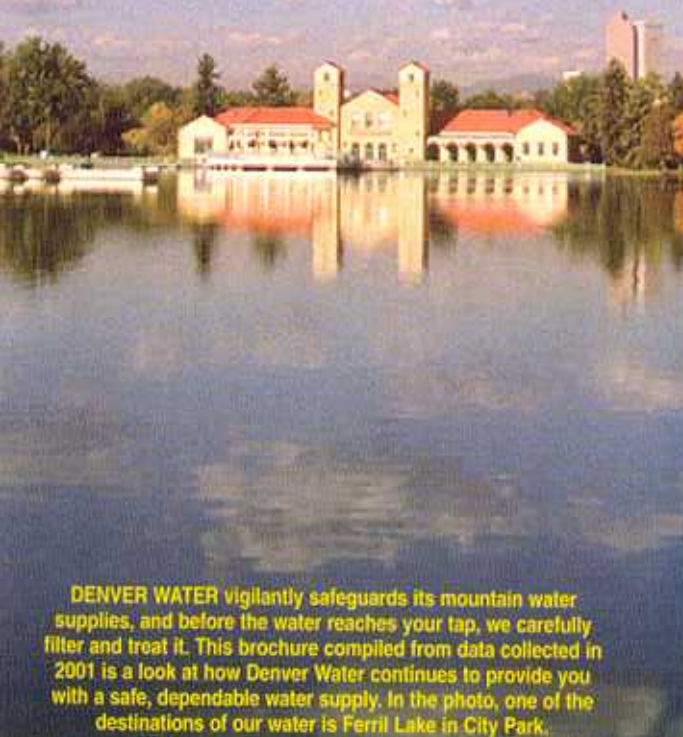


# DENVER WATER Water Quality Report 2002



DENVER WATER



DENVER WATER vigilantly safeguards its mountain water supplies, and before the water reaches your tap, we carefully filter and treat it. This brochure compiled from data collected in 2001 is a look at how Denver Water continues to provide you with a safe, dependable water supply. In the photo, one of the destinations of our water is Ferril Lake in City Park.

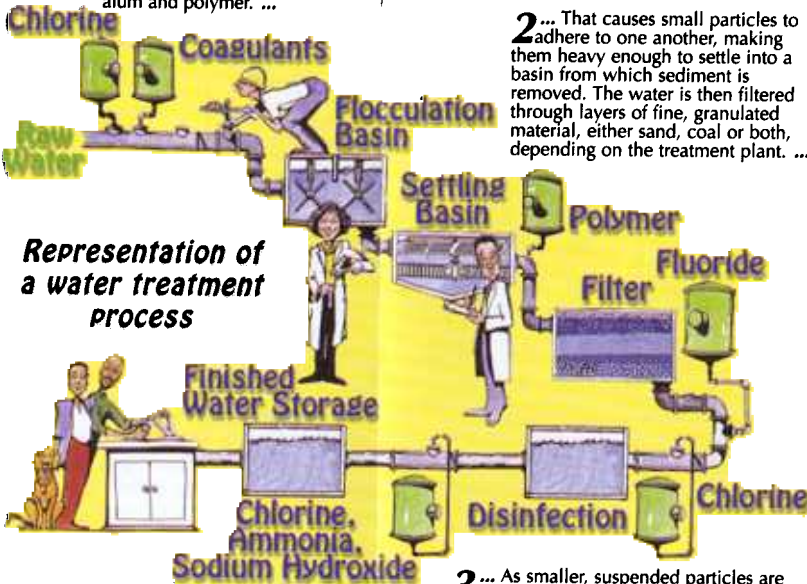
Visit us online at [www.denverwater.org](http://www.denverwater.org)

# Healthy notions

**ALL DRINKING WATER**, including bottled water, might reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that the water poses a health risk.

Immunocompromised individuals – such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, those with HIV-AIDS or other immune system disorders, and some elderly and infants – can be particularly at risk of infections. These people should seek advice about drinking water from their health care providers. For more information about contaminants and potential health effects, or to receive a copy of the U.S. Environmental Protection Agency and the U.S. Centers for Disease Control guidelines on appropriate means to lessen the risk of infection by *cryptosporidium* and microbiological contaminants, call the EPA Safe Drinking Water Hotline at 1-800-426-4791.

**1** The treatment process consists of five steps – coagulation, sedimentation, filtration, corrosion control and disinfection. First, raw water from terminal reservoirs is drawn into mixing basins at our treatment plants, where we add alum and polymer. ...



**Representation of a water treatment process**

**4** ... Denver Water carefully monitors the amount of chlorine added to maintain quality of water at the farthest reaches of the system. Fluoride occurs naturally but is also added to treated water, and pH is maintained by adding alkaline substances to reduce corrosion in the distribution system and your home or business.

# High water quality every step of the way

When you live in a semi-arid region and bring drinking water to more than a million people, you want to be certain there is enough to go around and that it is of the highest quality. That's a big job for Denver Water's 1,000 employees.

The department's goal always has been to produce a safe, dependable water supply and deliver it to metro homes and businesses at the lowest possible cost. Denver Water has been

treating and testing the quality of its water since inception, and our findings always have been made available to the public.

This report is our annual summary of where your water comes from, what's in it, and how we treat, protect and deliver drinking water — and how it compares to federal and state regulations. Denver Water's record remains unblemished: We're pleased to report that we've never violated a health standard.

All the department's facilities are under strict security, and we monitor

**2** ... That causes small particles to adhere to one another, making them heavy enough to settle into a basin from which sediment is removed. The water is then filtered through layers of fine, granulated material, either sand, coal or both, depending on the treatment plant. ...

**3** ... As smaller, suspended particles are removed, turbidity diminishes and clear water emerges. Finally, as protection against any bacteria and viruses that might remain, chlorine and ammonia are added before the water flows to underground reservoirs throughout the metro distribution system and into your home or business. ...

Denver's water supply from start to finish. Analysts regularly take test samples at many remote sites and our caretakers watch over mountain sources to head off any problems long before they reach treatment plants in the city. Our Water Quality Lab keeps an eye on quality through both its field staff and data sent from 15 automated monitoring stations throughout the metro area. The Lab in 2001 conducted 34,000 tests from 10,000 samples. Denver Water treated 81 billion gallons of water last year, an average of 222 million gallons daily.

El presente informe contiene información muy importante relacionada con el agua potable. Si quiere esta información en español, llame al 303-628-5986.

**DENVER WATER TESTS** a representative number of "high risk" homes for lead and copper under regulations requiring that 90 percent of samples be below the action level of 15 parts per billion for lead and 1.3 parts per million for copper. There is seldom any appreciable lead in these yearly tests. There is commonly a small amount of copper above the detection limit but substantially below maximum contaminant standards and action levels as indicated in this report. Call **303-628-6058** to obtain a Denver Water brochure about dangers of lead in drinking water and how to determine if there's lead in your home's plumbing.

# TREATED WATER QUALITY ROUNDUP

## Quality assurance

Last year, the Water Quality Lab at Marston, key to our quality assurance program, ran 34,000 tests from 10,000 samples while looking for more than 200 possible contaminants, many of which aren't regulated or detected. As the charts on this page reflect, very few of these substances were found in the city's treated water, all were well below allowed levels and none represents a health concern. For a full list of Denver Water's test results, call 303-628-5996.

REGULATED AT THE TREATMENT PLANT							
Substance	Violation	Sampling Period	MCLG*	MCL*	Denver Water's Average	Range of Detections	Sources of Substances
<i>Metals</i>							
<b>Barium</b> in parts per million (ppm)	No	Monthly	2	2	n/d <sup>1</sup>	n/d - 0.2	Erosion of natural deposits; discharge of drilling wastes
<i>Radiological</i>				(4mrem/yr)			
<b>Beta emitters</b> in picoCuries per liter (pCi/L)	No	Quarterly	0	50	2	n/d - 4	Decay of natural and man-made deposits
<b>Alpha emitters</b> in pCi/L	No	Quarterly	0	15	2	n/d - 2	Erosion of natural deposits
<b>Uranium</b> in parts per billion (ppb)	No	Quarterly	n/a <sup>2</sup>	30 <sup>3</sup>	0.8	n/d - 1.6	Erosion of natural deposits
<i>General</i>							
<b>Fluoride</b> in ppm	No	Monthly	4	4	0.84	0.22 - 1.20	Erosion of natural deposits; water additive that promotes strong teeth
<b>Nitrate</b> in ppm	No	Monthly	10	10	0.09	n/d - 0.21	Erosion of natural deposits; fertilizer; leaching from septic tanks, sewage
<b>Chloramine</b> as Cl <sub>2</sub> in ppm	No	Daily	4	4 <sup>4</sup>	1.51	1.02 - 1.86	Drinking water disinfectant
<b>Total Organic Carbon</b> in ppm	No	Monthly	n/a	TT <sup>5</sup>	1.3	0.8 - 2.2	Naturally present in the environment
<b>Turbidity</b> in Nephelometric Turbidity Units <sup>6</sup>	No	Daily	n/a	TT	Highest Level/2001 0.10 <sup>7</sup>	Monthly samples less than 0.5 NTU 100%	Soil runoff

\*MCLG and MCL: Maximum Contaminant Level Goal and Maximum Contaminant Level. <sup>1</sup> Non-detect: Laboratory analysis indicates that the constituent was not present. <sup>2</sup> Not applicable. <sup>3</sup> Effective December 2003. <sup>4</sup> Maximum Residual Disinfectant Level: Highest level of a disinfectant allowed in drinking water. There is convincing

evidence that addition of a disinfectant is necessary for control of microbial contaminants. <sup>5</sup> Treatment Technique: A required process intended to reduce the level of a contaminant in drinking water. <sup>6</sup> Turbidity is expressed in Nephelometric Turbidity Units (NTUs). <sup>7</sup> Must be less than 0.5 in 95% of monthly samples.



# UNREGULATED CONTAMINANTS<sup>1</sup>

Substance	MCLG	MCL	Denver's Water	Range of Detections	Sampling Period	Violation	Sources of Substances
<i>Organics</i>			<i>Averages</i>				
<b>Bromodichloromethane</b> in ppb	This group was tested as part of the EPA's Information Collection Rule (ICR). The analyses for the ICR were done to gather information on additional by-products of disinfection. Potential health effects of these compounds are not completely known.		5.9	0.6 - 12.4	Monthly	No	<i>Component of TTHM, by-product of drinking water chlorination (See chart below)</i>
<b>Bromoform</b> in ppb			n/d	n/d - 1.9	Monthly	No	
<b>Chlorodibromomethane</b> in ppb			1.4	n/d - 3.4	Monthly	No	
<b>Chloroform</b> in ppb			16.4	4.4 - 38.2	Monthly	No	
<b>Chloral hydrate</b> in ppb			1.2	0.4 - 3.3	Monthly	No	<i>By-product of drinking water chlorination</i>
<b>Chloropicrin</b> in ppb			n/d	n/d - 0.9	Monthly	No	
<b>Cyanogen chloride</b> in ppb			3.2	1.7 - 4.7	Annually	No	
<b>Haloacetonitriles</b> (HAN) in ppb			1.4	0.7 - 2.5	Monthly	No	
<b>Haloketones</b> (HK) in ppb			1.5	1.1 - 2.9	Monthly	No	
<b>Total organic halides</b> (TOX) in ppb			111	60 - 212	Monthly	No	
<i>Inorganics</i>							
<b>Sulfate</b> in ppm	250	250 (SMCL) <sup>2</sup>	43.1	14.0 - 71.1	Monthly	No	<i>Naturally present in the environment</i>
<b>Sodium</b> in ppm	n/a	n/a	14.3	5.4 - 24.0	Monthly	No	

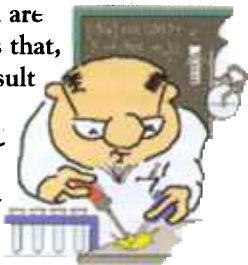
<sup>1</sup> Unregulated compounds are analyzed for consideration for future regulation. <sup>2</sup> Secondary Maximum Contaminant Level is a recommended level and is not enforceable.

# Crypto & Giardia

Denver Water has tested for *Cryptosporidium* and *Giardia* in both raw and treated water for more than 15 years and has never detected a viable indication of either in drinking water.

Crypto and Giardia are microscopic organisms that, when ingested, can result in diarrhea, cramps, fever and other gastrointestinal symptoms.

Most people readily recover from the symptoms, which can cause more serious illness in people with compromised immune systems. The organisms are in many of Colorado's rivers and streams and come from animal wastes in the watershed. Crypto and Giardia are removed by effective filtration at the plant. Disinfectants also kill Giardia.





# Turbidity clarified

The water department's goal is to bring its customers drinking water in abundant supplies that is not only clean and safe but that's also aesthetically pleasing. That means that when you turn on your tap, the water that flows looks good, tastes good and is good. Water that lacks clarity indicates higher turbidity levels, and while turbidity itself isn't a health hazard, it can provide the environment for contaminants that are. We use turbidity as a test to measure the relative clarity of drinking water. As you can see from the table at the top of this page, Denver Water's treatment processes result in clarity of its water far better than the regulated standard set and administered by state and federal agencies. Impurities and suspended matter such as silt, decaying plant particles, air bubbles and high iron concentrations in household plumbing cause turbidity. While some of these particles might provide "food" for bacteria, others can establish "shelter" for microbes by reducing their exposure to disinfectants. Both lower bacterial counts and the incidences of waterborne disease are related to effective filtration at the treatment plant. In recent years, regulations for lower turbidity have been strengthened, resulting in increased safety of drinking water supplies.

## REGULATED AT THE CUSTOMER'S TAP

Substance	Violation	MCLG	Action Level <sup>1</sup>	No. Samples Exceeding AL	90th Percentile Value	Sampling Period	Sources of Substances
Inorganics Lead in ppb	No	0	At the 90th Percentile 15	1 out of 51	7	Yearly	Corrosion of household plumbing
Copper in ppm	No	1.3	1.3	0 out of 51	0.21	Yearly	

Lead isn't found in Denver's treated water. However, it might be present in a home's or business's plumbing. <sup>1</sup>Action Level: Concentration of a contaminant that, when exceeded, triggers treatment or other requirements that a water system must follow.

Infants and young children are typically more vulnerable to lead in drinking water than the general population. It is possible that lead levels at your home might be higher than at other homes in the community as a result of materials used in your home's plumbing. If you are concerned about elevated lead levels in your home's water, you might wish to have your water

tested and to flush your tap for 30 seconds to two minutes before using tap water. (Always use cold tap water for food and beverage preparation. Hot tap water can leach higher amounts of lead and other metals from plumbing or hot water tank.) Additional information is available from the U.S. Environmental Protection Agency's Safe Drinking Water Hotline at 800-426-4791.

El presente informe contiene información muy importante relacionada con el agua potable. Si quiere esta información en español, llame al 303-628-5986.

## The Glossary

**CONTAMINANT:** A potentially harmful physical, biological, chemical or radiological substance.  
**MAXIMUM CONTAMINANT LEVEL (MCL):** The highest level of a contaminant that is allowed in drinking water. MCLs are set as close to the Maximum Contaminant Level Goal as feasible using the best available treatment technology.  
**MAXIMUM CONTAMINANT LEVEL GOAL (MCLG):** The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs allow for a margin of safety.  
**PARTS PER MILLION (PPM):** Equivalent to milligrams per liter. One ppm is comparable to one drop of water in 55 gallons.  
**PARTS PER BILLION (PPB):** One ppb is equivalent to one drop of water in 55,000 gallons.  
**PICO CURIES PER LITER (pCi/L) & 4MREMS/YR:** Measures of radioactivity.

## REGULATED IN THE DISTRIBUTION SYSTEM

Substance	Violation	MCLG	MCL	Denver's Water	Range of Detections	Sample Period	Sources of Substances
Organic Disinfection By-Product (DBP) Total Trihalomethanes <sup>1</sup> (TTHM) in ppb	No	0	100	Average 26	18 - 33	Quarterly	By-product of drinking water chlorination
Haloacetic acids <sup>2</sup> (HAA5) in ppb	No	n/a	60 <sup>2</sup>	13	6 - 35	Quarterly	
Microbiological Total Coliform <sup>3</sup> in percent positive/month	No	0	5% <sup>4</sup>	Highest monthly % 0.72% Oct. '01	9 positive detects out of 5,227 samples, or 0.17%	Daily	Naturally present in the environment

<sup>1</sup>Total Trihalomethanes: By-products of the disinfection process that are potential cancer risks at levels at or beyond regulated levels over long periods of time. Regulations require that each be reported by running annual averages. Averages are calculated quarterly at each treatment plant and other sites. <sup>2</sup>Effective Jan. 1, 2002. Compliance for HAA5's

will be based on a running annual average, not any single value. <sup>3</sup>Total Coliform is naturally present in the environment and isn't harmful. However, it is an indicator that potentially harmful bacteria might be present. <sup>4</sup>Less than 5% positive in any month.



# Sources of Denver's Water

